

# PATENT SPECIFICATION

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## (54) A METHOD OF MAKING TOBACCO SHEET

(71) We, CARRERAS LIMITED, a Company organised under the laws of Great Britain, of Christopher Martin Road, Basildon, Essex, do hereby declare the invention, for 5 which we pray that a patent may be granted to us and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to a method of 10 making tobacco sheet from tobacco main stalk. This sheet may be used either as a cigar binder or as a wrapper/binder and it is especially suited for use on high-speed continuous rod manufacturing machines of the 15 cigarette-making type.

It is known to make tobacco sheet by conventional papermaking processes. Sheet made in this way has an inherent strength advantage over sheet made by methods involving homogenization of materials obtained from other 20 parts of the tobacco plant, namely main leaf and mid-rib stems. Moreover, in order to impart sufficient tensile strength to homogenized tobacco sheet, the addition of binders 25 has hitherto been necessary, and such additions are contrary to the Customs and Excise Act 1952 (15 and 16 Geo. 6 and 1 Eliz. 2, Ch. 44). A further disadvantage of homogenized sheet is that the porosity is so excessive as to make the sheet unsuitable for 30 use as a wrapping/binder due to the entry of air through the sides of the tobacco rod while the smoker is drawing smoke into the mouth. Because of this fault excessive dilution of the smoke stream occurs at the time 35 of smoking. Yet a further disadvantage of homogenized sheet is the fact that moisture content must be kept relatively high so as to ensure the necessary flexibility at the time 40 of making into cigars.

Hitherto tobacco sheets resulting from the paper-making processes have also shown a number of disadvantages, including poor burning rate when used to encase the filler tobacco,

poor colour and lack of true tobacco burning aroma. Further, to improve the sheet appearance it has hitherto been necessary to subject the stock to a prolonged beating action: this reduces the ultimate sheet porosity to such an extent that the burning rate becomes so poor that the smoking product (cigar) has to be re-lit several times during smoking.

According to the present invention a method of 45 making a tobacco sheet for use as a wrapper or wrapper binder to enclose a shredded or cut tobacco in a smoking product includes crushing tobacco main stalk and then treating it with caustic soda, washing it to remove all traces of the caustic soda and then milling the stalk and subsequently screening it, treating the retained fibres to shorten any long fibres and then making the pulp up into a sheet on a paper making machine.

In a preferred method the main stalk is 50 added to four times its weight of caustic soda liquor, the latter having a concentration such that the mixture contains between 10% and 40% NaOH by weight, based on the weight of oven-dried stalks, depending on the 55 desired base colour of the end product.

The stalk material may be broken down by 60 a pressurised caustic boiling operation in which a concentration of 10%—40% NaOH by weight is used with a liquor ratio of 4 to 1 in a pressure vessel at 50lbs per square inch for a period of eight hours.

Preferably the main stalk is initially crushed 65 and cut into lengths of 2 to 3 inches prior to caustic treatment and the cut lengths are then freed from surplus dust, for instance by tumbling and pneumatic dust extraction.

The pulp may be disintegrated in a Hydrapulper after the caustic treatment and the dispersion is preferably treated in a beater 70 fitted with knife bars and bedplate to disintegrate any remaining long fibres. The very fine material may be removed by using the wash wheel of the beater or by a separate 75

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fine screening operation and if desired the degree of the beating to remove coarse pieces can be minimised by using a coarse slotted screen immediately before passing the beaten stock to a paper making machine on which the treated material is made up into a sheet. To achieve the desired degree of sheet porosity the mixture must then be subjected to a screening process to remove the very fine material which accumulates during the beating period. This may be done in one of two ways. Beating is continued long enough to remove all the shive pieces but not so long that excessive fibrillation and closing of the sheet takes place. The fines are then removed by using the wash drum on the beater or by passing the stock through a separate wash drum in which the pitch of the screen is approximately 80 mesh. Alternatively, the beating is carried out for a much shorter period and the stock is passed through a coarse slotted screen which removes the remaining shive pieces.

In any case, the process also preferably includes treating the sheet with a tobacco extract which is preferably prepared by cooking a dispersion of mid-rib stems and/or offal and concentrating the resultant liquors by evaporation. The concentrated aqueous tobacco extract can then be applied to the tobacco sheet in the requisite amounts to meet the burning rate and colour level specifications of the final sheet. The extract may be applied at the wet end of the paper-making machine or by using a size press at the dry end of the machine during the sheet making process, or after the sheet making process by using a coating machine. In the latter case, such paper feeding configurations may be used so as to provide dip-coating, surface coating, or gravure coating, and gravure-type printing may be used to reproduce a vein-like appearance on the surface of the sheet.

The invention also includes tobacco sheet made up according to the method and to a smoking product the outer wrapper and/or the inner binder of which is made from the sheet.

The invention may be performed in many ways but one method of making sheet according to the invention will now be described by way of example.

In the method to be described the tobacco main stalk is first crushed between mangle rollers and chopped into lengths of 2 to 3 inches. Surplus dust is removed from the chopped lengths by tumbling these in a rotating cylinder which has sieves and a dust extractor fitted. The chopped material is then fed into a digester together with four times its weight of caustic soda liquor, the latter having a concentration such that the mixture contains 20% NaOH by weight, based on the weight of oven-dried stalks. After a heating-up period of 1 hour, the mixture is kept for 8 hours at a pressure of 50 p.s.i. The digested material is now subjected to a laboratory test for take-up of NaOH and is then washed until the pump shows negative results for NaOH. It is then submitted to a disintegrating action in a Hydrapulper for a period sufficient to break up the fibre clumps. At this point the fibre yield is determined. The mixture is now transferred to a beater where the remaining shives are disintegrated by agitation and ultimately cut by the beating action which is intensified as the gap setting between the knife bars and the bed-plate is gradually reduced during the beating period.

To achieve the desired degree of sheet porosity the mixture must then be subjected to a screening process to remove the very fine material which accumulates during the beating period. This may be done in one of two ways. Beating is continued long enough to remove all the shive pieces but not so long that excessive fibrillation and closing of the sheet takes place. The fines are then removed by using the wash drum on the beater or by passing the stock through a separate wash drum in which the pitch of the screen is approximately 80 mesh. Alternatively, the beating is carried out for a much shorter period and the stock is passed through a coarse slotted screen which removes the remaining shive pieces.

The screened pulp is diluted to a consistency of approximately 2% and formed into a sheet on a Fourdrinier machine on which provision has been made for back water recirculation. Sheet breakage at the lower substance levels can be reduced by the use of felts at the press roll section of the making machine.

An aqueous tobacco extract is prepared (according to the present example) in the following manner. A dispersion of 1,500 grams mid-rib stems in 5 litres of water is pressure-cooked for 1 hour at 50 p.s.i. at 140°C. The resultant liquor is filtered off and concentrated by evaporation to a viscosity suitable for coating. The concentrated extract is applied after completion of the tobacco sheet by the use of a Dixon coater and, a gravure-type roller can be used as to reproduce a vein-like appearance on the surface of the sheet.

During manufacture it has been found that the total fibre yield can be as high as 43.1% and the yield after screening 30.2%.

Comparisons of the physical characteristics of a sheet made according to the invention and those of traditionally used white cigarette paper are shown in the table.

Substance	Tensile Strength (grams/Metre <sup>2</sup> )	Porosity (Sec/100cc)
White cigarette Paper (Control)	24.1	2.5
Tobacco Sheet	28	6.0

The test methods used for these comparisons were those recommended by the Technical Section of the British Paper and Board Makers' Association

The invention has many advantages, one being that 100% tobacco main stalk, can be used, without the use of any other additives, and a good sheet appearance is achieved by means of the improved method for removing shive pieces. Moreover, the optimum porosity

of the sheet is obtained so as to provide continuous burning of the smoking product without the need to relight during smoking.

Yet a further advantage is that the colour of the sheet too can be improved to a desirable shade and some flavour characteristics can be implanted by making use of a water-soluble extract of 100% tobacco obtained from mid-rib stem and/or offal. The addition of this aqueous tobacco extract also has the desirable feature of improving the burning rate without seriously reducing the sheet porosity.

The invention also provides for the optimum yield of tobacco sheet compatible with good appearance (low content of shive pieces) and optimum sheet porosity (low content of fine particles).

#### WHAT WE CLAIM IS:—

1. A method of making a tobacco sheet for use as a wrapper or wrapper binding to enclose a threshed or cut tobacco in a smoking product and which includes crushing tobacco main stalk and then treating it with caustic soda, washing it to remove all traces of the caustic soda and then milling the stalk and subsequently screening it, treating the retained fibres to shorten any long fibres and then making the pulp up into a sheet on a paper making machine.
2. A method as claimed in Claim 1 which includes adding the main stalk to four times its weight of caustic soda liquor.
3. A method as claimed in Claim 2 in which a concentration of 10%—40% NaOH by weight is used.
4. A method as claimed in any one of the preceding claims 3 or 4 in which the stalk material is broken down by a pressurised caustic boiling operation in which a concentration of 10—40% NaOH by weight is used with a liquor ratio of 4 to 1 in a pressure vessel at 50 lbs per square inch for a period of eight hours.
5. A method as claimed in Claim 3 or Claim 4 in which the concentration of NaOH is 20%, by weight.
6. A method as claimed in any one of Claims 1 to 5 in which the main stalk is crushed and chopped into lengths of 2—3 inches.
7. A method as claimed in any one of the preceding claims in which the treated main stalk is submitted to a disintegrating action in a Hydrapulper after the caustic treatment.
8. A method as claimed in any one of Claims 1 to 7 in which the fibre shortening operation is carried out on a beater fitted with knife bars and bedplate.
9. A method as claimed in any one of the preceding claims 1 to 8 in which the sheet is made up on a Fourdrinier machine with provision for back water recirculation.
10. A method as claimed in any one of the preceding claims which includes treating the sheet with a tobacco extract.
11. A method as claimed in Claim 10 in which the tobacco extract is prepared by cooking mid-rib stems and/or offal and then concentrating by evaporation to a viscosity suitable to the method of application to the sheet.
12. A method as claimed in Claim 11 in which the extract is applied to the formed sheet by a coating machine.
13. A method as claimed in Claim 16 in which a gravure type printing is used to reproduce a vein like appearance on the surface of the sheet.
14. A method of making a tobacco sheet substantially as described herein.
15. A tobacco sheet made by the method set forth in any one of the preceding claims.
16. A smoking product the outer wrapper and/or inner binder of which is made from the sheet set forth in Claim 15.

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